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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/978,076	10/17/2001	Yoshihisa Itoh	Q66707	3171

7590

02/11/2004

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EXAMINER
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AGUSTIN, PETER VINCENT

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 02/11/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/978,076

Applicant(s)

ITOH ET AL.

Examiner

Peter Vincent M Agustin

Art Unit

2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2 is/are allowed.
- 6) ☒ Claim(s) 1, 3-6 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All   b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_                      6) ☐ Other: \_\_\_\_

**DETAILED ACTION**

***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Drawings***

2. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "15" on figure 1 has been used to designate both "spatial light modulator" and "dot matrix panel". Also, reference character "17" has been used to designate two different elements (see figures 1, 5 & 8). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Figure 5, element 19, mentioned on page 16; figure 8, element 199, mentioned on page 16. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

*Specification*

5. The disclosure is objected to because of the following informalities:

Page 6, 3<sup>rd</sup> paragraph: "having a shorter than" should be --having a wavelength shorter than--.

Page 6, last paragraph; and page 7, 2<sup>nd</sup> paragraph: "an hologram" should be --a hologram--.

Page 8, 1<sup>st</sup> paragraph: "SLM 5" should be --SLM 15-- to match drawings.

Page 8, 25<sup>th</sup> line: "disposed the" should be --disposed along the--.

Page 9, 3<sup>rd</sup> line: Delete "of".

Page 12, line 8: " $D1 < D2$ " should be -- $D1 > D2$ --.

Page 13, 5<sup>th</sup> line: "from" should be --front--.

Page 19, 17<sup>th</sup> line: "converge" should be --converging--.

Page 20, 4<sup>th</sup> line: "miniaturize" should be --miniaturized--.

6. The above errors are just examples. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

7. Claim 6 objected to because of the following informalities:

2<sup>nd</sup> line: "when" should be --wherein--.

2<sup>nd</sup> line: "gate light" should be --a gate light beam--.

3<sup>rd</sup> line: "a shorter" should be --a wavelength shorter--.

***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-6 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 14-15 recite the limitation “the reference light beam” and line 22 recites “the light interference pattern”. There is insufficient antecedent basis for these limitations in the claim.

Claims 2-6 are rejected because these claims are dependent on the rejected independent claim 1.

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claim 1 rejected under 35 U.S.C. 102(e) as being anticipated by Kawano et al. (hereafter Kawano) (US 6,452,890).

Kawano discloses a hologram recording and reproducing apparatus (figure 4) for recording data on a recording medium (10) and reproducing data from the recording medium, the

recording medium being made of a photorefractive crystal (column 1, lines 39-46) having a parallel plate shape, said apparatus comprising: a support portion (inherently disclosed) for detachably supporting and rotating the recording medium (see also column 21, lines 1-7); a recording-reference-light-beam-supplying-portion (91, 92a, 92c, 93b & 94b) for supplying a coherent recording reference light beam (2) propagating along an optical axis to a major surface of said recording medium; a signal-light-beam-supplying-portion (91, 92a, 93a, 94a, 95 & 92b) for supplying a coherent signal light beam (1) which is modulated in accordance with image data, in an optical path into the recording medium such that said signal light beam intersects with the reference light beam (figures 3a & 3b) to produce an optical interference pattern (column 9, lines 11-16) with said reference and signal light beams within said recording medium; a reproducing-reference-light-beam-supplying-portion (91, 92a, 92c, 93c & 94c) for supplying into the recording medium a coherent reproducing reference light beam (3) propagating in an opposite direction along said optical axis of the recording reference light beam to generate a phase conjugation wave (4) from a refractive-index grating of the light interference pattern; a splitting portion (92b) for splitting the phase conjugation wave from the optical path of said signal light beam to image a dot pattern with the phase conjugation wave; and a photo-detecting portion (96) for detecting the dot pattern imaged with said phase conjugation wave to reproduce the image data.

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano as applied to claim 1 above, and further in view of Liu et al. (hereafter Liu) (US 6,272,095).

For a description of Kawano, see the rejection above. Kawano, however, does not disclose that the reproducing-reference-light-beam-supplying-portion includes a reflector for reflecting the recording reference light beam passing through said recording medium back to said recording medium; and a shutter capable of cutting off said recording reference light beam and disposed in the optical path to said reflector.

Liu discloses in figure 2 a holographic storing apparatus that uses a reflector (128) for reflecting a transmitted light beam (114) passing through a recording medium (100) back to said recording medium as a reflected collimated beam (112'), the reflector being provided in order to eliminate the mirrors used to direct the reflected collimated beam to the opposite side of the disk (column 18, lines 43-47); and a shutter (129) capable of cutting off said transmitted light beam and disposed in the optical path to said reflector (see also column 19, lines 37-44), the shutter being provided in order to allow the reflected collimated beam to pass during write operations and blocks the reflected collimated beam during read operations, thereby preventing the reflected collimated beam from reaching the detector and causing noise. It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to have provided the reflector of Liu to the reproducing-reference-light-beam-supplying-portion of Kawano, the motivation being to eliminate the mirrors used to direct the reproducing reference light beam to the opposite side of the recording medium; and to have provided the shutter of Liu to the reproducing-reference-light-beam-supplying-portion of Kawano, the motivation being to allow the

reproducing reference light beam to pass during reproduction mode, while blocking the reproducing reference light beam during recording mode, thereby preventing the reproducing reference light beam from reaching the detector and causing noise.

14. Claim 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano as applied to claim 1 above, and further in view of Biles et al. (hereafter Biles) (US 4,993,789).

For a description of Kawano, see the rejection above. Furthermore, Kawano discloses  $\frac{1}{2}$  wave plates disposed in several configurations (according to different embodiments), e.g., along the optical path of the diffracted beam (column 10, lines 28-31); along the optical path of the signal beam (column 10, lines 43-48); along the optical path of the recording reference beam (column 12, lines 16-18). However, a  $\frac{1}{2}$  wave plate disposed in the optical path of the reproducing reference light beam is not disclosed.

Biles discloses a step of inserting a half-wave plate between a laser and a holographic optical element in order to provide a horizontal polarization to the originally vertically polarized light emitted from the laser (column 11, line 62 thru column 12, line 4). It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to have disposed the  $\frac{1}{2}$  wave plate of Kawano along the optical path of the reproducing reference light beam, the motivation being to rotate the polarization of the reproducing reference light beam by an angle of 90 degrees with respect to the signal light beam (as suggested by Biles), thereby completely separating the reproducing reference light beam from the signal light beam and effectively reconstructing the original signal without the presence of noise.

15. Claim 5 rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano as applied to claim 1 above, and further in view of Liu & Roh et al. (hereafter Roh) (US 2002/0163872).



For a description of Kawano, see the rejection above. Kawano, however, does not disclose that the reproducing-reference-light-beam-supplying-portion includes a reflector for reflecting the recording reference light beam passing through said recording medium back to said recording medium; and a  $\frac{1}{4}$  wave plate disposed in the optical path to said reflector.

Liu discloses a holographic storing apparatus (figure 2) that uses a reflector (128) for reflecting a transmitted light beam (114) passing through a recording medium (100) back to said recording medium as a reflected collimated beam (112'), the reflector being provided in order to eliminate the mirrors used to direct the reflected collimated beam to the opposite side of the disk (column 18, lines 43-47); and a shutter (129) capable of cutting off said transmitted light beam and disposed in the optical path to said reflector (see also column 19, lines 37-44), the shutter being provided in order to allow the reflected collimated beam to pass during write operations and blocks the reflected collimated beam during read operations, thereby preventing the reflected collimated beam from reaching the detector and causing noise.

Roh discloses in figure 9 a shutter (918) which opens during recording mode and shuts off during reproducing mode to allow only the reference beam to pass and to block the unwanted beam (see page 8, paragraph 0093). Roh also discloses that a polarizer or a wave plate can be used to control the holographic signal beam on behalf of the shutter (see page 8, paragraph 0094), i.e., a  $\frac{1}{4}$  wave plate can be used in lieu of the shutter. It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to have replaced the shutter of Liu with a  $\frac{1}{4}$  wave plate as suggested by Roh, the motivation being to enable blocking of the unwanted holographic signal during reproduction mode without using a shutter.

Furthermore, it would have been obvious to one of ordinary skill in the art at the time of invention by applicant to have provided the reflector of Liu to the reproducing-reference-light-beam-supplying-portion of Kawano, the motivation being to eliminate the mirrors used to direct the reproducing reference light beam to the opposite side of the recording medium; and to have provided the  $\frac{1}{4}$  wave plate of Roh to the reproducing-reference-light-beam-supplying-portion of Kawano, the motivation being to allow the reproducing reference light beam to pass during reproduction mode, while blocking the reproducing reference light beam during recording mode, thereby preventing the reproducing reference light beam from reaching the detector and causing noise.

16. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano as applied to claim 1 above, and further in view of Kitamura et al. (hereafter Kitamura) (US 6,373,806).

For a description of Kawano, see the rejection above. Kawano, however, does not disclose that said recording medium is sensitive to a gate light beam having a wavelength shorter than that of the reference and signal light beams to develop light induced absorption, said apparatus further comprising a gate-light-beam-supplying-portion for supplying the gate light beam into the recording medium.

Kitamura discloses a hologram recording apparatus (figure 2) having a recording medium (10) sensitive to a gate light beam (22) having a wavelength shorter than that of reference (12b) and signal (12a) light beams to develop light induced absorption (column 5, lines 15-18), said apparatus further comprising a gate-light-beam-supplying-portion (32, 33d, 21 & 31c) for supplying the gate light beam into the recording medium (see also column 5, lines 37-43), the gate-light-beam-supplying-portion being provided to develop the recording sensitivity of the

hologram recording medium and to activate or inactivate a refractive index grating in accordance with the presence or absence of a light interference pattern formed by a signal light and a reference light (column 5, lines 40-44). It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to have added the gate-light-beam-supplying-portion of Kitamura to the apparatus of Kawano, the motivation being to improve the recording sensitivity of the recording medium and to activate or inactivate the refractive index grating in accordance with the presence or absence of the light interference pattern formed by the signal light beam and the recording reference light beam.

#### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gregg et al. (US 4,908,815) discloses in column 4, lines 31-33 the use of a quarter wave plate to block an unwanted portion of a beam, instead of a shutter.

#### ***Allowable Subject Matter***

18. Claim 2 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

19. The following is a statement of reasons for the indication of allowable subject matter: As noted in the 102 rejection above, Kawano discloses a hologram recording and reproducing apparatus having a reproducing-reference-light-beam-supplying-portion for supplying a reproducing reference light beam and a recording-reference-light-beam-supplying-portion for supplying a recording reference light beam. However, no prior art of record alone or in

Art Unit: 2652

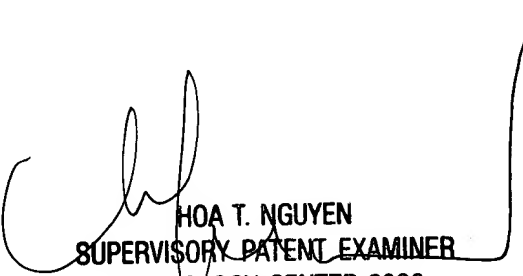
combination discloses a reproducing reference light beam with an across-section having an area larger than that of said recording reference light beam.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Vincent Agustin whose telephone number is (703) 305-8980. The examiner can normally be reached on Monday thru Friday 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

PVA  
01/22/2004

  
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2/3/04